EXHIBIT 1

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

WSOU INVESTMENTS, LLC D/B/A BRAZOS LICENSING AND DEVELOPMENT, *Plaintiff*,	§	**Case No. 6:20-cv-00952-ADA**
	§	**JURY TRIAL DEMANDED**
v.	§	
ONEPLUS TECHNOLOGY (SHENZHEN) CO., LTD., *Defendant.*	§	

PLAINTIFF'S DISCLOSURES OF
PRELIMINARY INFRINGEMENT CONTENTIONS

Pursuant to the Court's Order Governing Proceeding – Patent Case ("Order Governing Proceeding"), Plaintiff WSOU Investments, LLC d/b/a Brazos Licensing and Development ("WSOU") hereby provides its Initial Infringements Contentions to defendant OnePlus Technology (Shenzhen) Co., Ltd. ("OnePlus" or "Defendant") for U.S. Patent No. 8,149,776 (the "'776 Patent").

WSOU makes this disclosure based on the information presently available to it. Discovery in this case has not started, and WSOU reserves its right to amend or supplement these disclosures as permitted by the Federal Rules of Civil Procedure, by the local rules of the Western District of Texas, and by order of the Court, including the Court's Order Governing Proceedings.

For each Asserted Claim, Plaintiff identifies the following Accused Instrumentalities of which it is currently aware. The identification of Accused Instrumentalities is based on Plaintiff's research and analysis to date, without the benefit of discovery from the Defendant. Plaintiff reserves the right to add, delete, substitute or otherwise amend this list of Accused

Instrumentalities based on discovery or other circumstances, in a manner consistent with the Federal Rules of Civil Procedures, local rules, and standing orders.

The Accused Instrumentalities include, without limitation, the following:

- OnePlus mobiles that support 4G (like OnePlus 8, 8 Pro, Nord, 9, 9 Pro).
- All past, current and future OnePlus products and services that operate in the same or substantially similar manner as the specifically identified products and services above and described in Exhibit 1.
- All past, current and future OnePlus products and services that have the same or substantially similar features as the specifically identified products and services above and described in Exhibit 1.

Plaintiff's infringement contentions apply to the Accused Instrumentalities as well as all other past, current and future hardware and software products and services developed, made, used, offered for sale, sold, imported, and provided by OnePlus that contain or makes use of the Patented Technology.[1]

Based upon publicly available information, WSOU asserts that OnePlus has infringed and/or continues to infringe the patent and claims identified in the attached claim charts (the "Asserted Claims" of the "Patent-in-Suit"). Infringement claim charts evidencing the correspondence between (i) the elements of the Asserted Claims, and (ii) the corresponding items of the accused products are attached hereto. Further, Exhibit 1, which is attached hereto and incorporated by reference, is an exemplary infringement claim chart identifying specifically where each limitation of each Asserted Claim is found within each Accused Instrumentality or practiced by each Accused Instrumentality.

[1] "Patented Technology" means all technologies described in the claims of the Patent-in-Suit.

Plaintiff asserts that Defendant has directly infringed and continues to directly infringe the Asserted Claims literally through the Accused Instrumentalities by making, using, offering for sale, and/or selling, or importing into the United States the Accused Instrumentalities. To the extent that Defendant alleges that one or more limitations of the Asserted Claims are not literally found in the Accused Instrumentalities, Plaintiff alleges that such limitations are found in or practiced by the Accused Instrumentalities under the doctrine of equivalents. Any differences alleged to exist between any of the Asserted Claims and any of the Accused Instrumentalities are insubstantial and that each Accused Instrumentality also meets each limitation under the doctrine of equivalents as the identified features of the Accused Instrumentality performs substantially the same function in substantially the same way to achieve substantially the same result as the corresponding claim limitation. WSOU reserves the right to assert infringement solely under the doctrine of equivalents with respect to any particular claim element(s), if warranted by discovery, further analysis, and/or claim constructions in this case.

Plaintiff further asserts that Defendant has indirectly infringed and continues to indirectly infringe by actively inducing and contributing to infringement of one or more of the claims of the Asserted Patent through the Accused Instrumentalities. Plaintiff also asserts that these third-parties directly infringe at least one or more of the claims of the Asserted Patent through the use of, implementation of, and/or integration with one or more of the Accused Instrumentalities.

For example, Defendant has actively induced infringement by encouraging the use of the Accused Instrumentalities in ways that infringe each Asserted Claim. Defendant knew or should have known that such encouragement would induce infringement. Defendant has taken active steps with the specific intent to encourage and cause others to use each Accused Instrumentality in ways that infringe each Asserted Claim. Such active steps by Defendant with specific intent to

induce infringement have included, among other things, advertising, promoting, marketing, making available for use, offering to sell, and/or selling the Accused Instrumentalities to others; encouraging and influencing others to import, offer to sell, and/or sell the Accused Instrumentalities; directing and instructing others to use the Accused Instrumentalities in infringing ways; and by providing the Accused Instrumentalities to others. OnePlus has performed the aforementioned active steps with the knowledge of the Asserted Patent at least as of the date when the complaint in this case was filed. OnePlus has known or should have known that the acts it has induced constitute infringement because, for instance, it has been aware that end users and resellers will purchase the Accused Instrumentalities will use them, resulting in direct infringement.

Further, for instance, the Accused Instrumentalities are known by Defendant to be especially made or especially adapted for use to infringe the Asserted Patent, and are not staple articles or commodity of commerce suitable for substantial non-infringing uses. Defendant contributes to the infringement of the Asserted Patent by making available for use, offering for sale, selling, and/or importing the Accused Instrumentalities to third parties, who use the Accused Instrumentalities and/or practice one or more claims of the Asserted Patent. Moreover, Defendant has had notice of the Asserted Patent at least as of the filing of the Complaint in this case.

These Infringement Contentions, including Exhibit 1, are based upon publicly-available information, and Plaintiff's research and analysis to date. The Accused Instrumentalities involve confidential, proprietary designs that are not publicly available, and Defendant has not yet provided discovery. Discovery is ongoing, and Plaintiff anticipates that the subject matter of these infringement contentions will be the subject of expert discovery. Discovery will provide evidence of Defendant's infringement, may lead to the discovery of additional instances of infringement,

and may also enable identification of additional claims that are infringed by Defendant. Plaintiff reserves the right to add, delete, substitute, or otherwise further amend these Infringement Contentions based on discovery or other circumstances, in a manner consistent with the Federal Rules of Civil Procedures, local rules, and standing orders. Plaintiff explicitly reserves the right to further modify and/or supplement these contentions with additional or different theories and/or additional or different evidence. Further, WSOU reserves the right to supplement or revise its infringement contentions and/or chart, including identification of additional asserted claims, based on, for example, new versions or variations of one or more of the Accused Instrumentalities that are later discovered.

PRIORITY DATE

Each of the Asserted Claims of the '776 Patent is entitled to a priority date of no later than May 12, 2009. The subject matter described by the Asserted Claims, however, may have been conceived and reduced to practice prior to this priority date. WSOU also reserves the right to identify any portions of the file history as containing evidence of conception and reduction to practice. Plaintiff's research and analysis is ongoing and Plaintiff reserves the right to assert that the claims are entitled to a priority date that is earlier than the above date.

Dated: May 18, 2021

RESPECTFULLY SUBMITTED,

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CERTIFICATE OF SERVICE

A true and correct copy of the foregoing instrument was served or delivered electronically to all counsel of record, on this 18th day of May, 2021.

/s/ Jonathan K. Waldrop
Jonathan K. Waldrop

Exhibit 1 to
WSOU Investments, LLC's
Infringement Contentions

Infringement Claim Chart of U.S. Patent No. 8,149,776 (the "Asserted Patent")

The Accused Instrumentalities include, without limitation, OnePlus Technology (Shenzhen) Co., Ltd. ("OnePlus" or "Defendant"), OnePlus mobiles that support 4G (like OnePlus 8, 8 Pro, Nord, 9, 9 Pro); all past, current and future OnePlus products and services that operate in the same or substantially similar manner as the specifically identified products and services; and all past, current and future OnePlus products and services that have the same or substantially similar features as the specifically identified products and services.

WSOU Investments, LLC ("WSOU" or "Plaintiff") contends that OnePlus, including OnePlus's employees, directly infringes each of the Asserted Claims, either literally or under the doctrine of equivalents. WSOU also contends that OnePlus has indirectly infringed and continues to indirectly infringe by contributing to and actively inducing infringement of one or more of the Asserted Claims.

WSOU does not intend this exemplary claim chart to be limiting, and WSOU reserves its rights to pursue other accused instrumentalities, patent claims, evidence, and infringement arguments in this case.

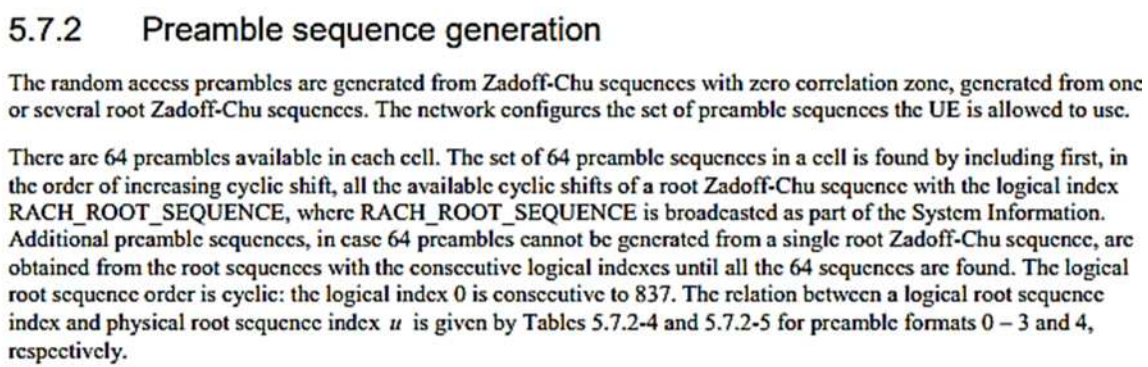
Exhibit(s)	Description	Link
Exhibit A	OnePlus 8 Pro Specifications	https://www.oneplus.in/8-pro/specs?from=8pro
Exhibit B	OnePlus 8 Pro Processor	https://www.oneplus.com/8-pro
Exhibit C	Qualcomm Snapdragon 865 supports 4G connectivity	https://www.qualcomm.com/products/snapdragon-865-5g-mobile-platform
Exhibit D	Generation of Preambles	https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/08.06.00_60/ts_136211v080600p.pdf
Exhibit E	Transmission of Preambles	https://www.etsi.org/deliver/etsi_ts/136300_136399/136321/15.02.00_60/ts_136321v150200p.pdf
Exhibit F	Reception of Random Access Response	https://www.sharetechnote.com/html/Handbook_LTE_BL_CE_RACH.html
Exhibit G	Ramping step	http://kiranteja91.blogspot.com/2015/01/lte-rach-procedure.html
Exhibit H	Power Ramping Step	https://www.etsi.org/deliver/etsi_ts/136300_136399/136331/15.03.00_60/ts_136331v150300p.pdf
Exhibit I	Zadoff-Chu Sequence	http://www.sharetechnote.com/html/Handbook_LTE_Zadoff_Chu_Sequence.html

Claims	OnePlus 8, 8 Pro, Nord, 9 and 9 Pro(The accused products)
10Pre. An apparatus comprising: **10a.** a transmitter configured to attempt access to a wireless network by sending on a random access channel at a first transmit power a first preamble comprising a signature sequence randomly selected from a set of signature sequences;	The accused product is an apparatus in which a transmitter configured to attempt access to a wireless network by sending on a random access channel at a first transmit power a first preamble comprising a signature sequence randomly selected from a set of signature sequences. OnePlus is a smartphone manufacturer that releases many phones such as OnePlus 8, 8 Pro, Nord, 9, 9 Pro etc. These devices support 4G mobile network connectivity. By way of an example, OnePlus 8 Pro comprises of 4G and 5G supported Qualcomm Snapdragon 865 processor along with the Qualcomm Snapdragon X55 Modem-RF system for transmission of signals, as shown in Fig. 1 to Fig. 3. **Citation 1: OnePlus 8 Pro Specifications** Performance Operating System: OxygenOS based on Android™ 10 CPU: Qualcomm® Snapdragon™ 865 5G Chipset: X55 GPU: Adreno 650 RAM: 8GB/12GB LPDDR5 Storage: 128GB/256GB UFS 3.0 2-LANE Battery: 4510 mAh (non-removable) Warp Charge 30T Fast Charging (5V/6A) 30W Wireless Charging 865 Qualcomm snapdragon Fig. 1

	Source: https://www.oneplus.in/8-pro/specs?from=8pro, Page 2&3, Last Accessed April 01, 2021, Exhibit A **Citation 2: OnePlus 8 Pro Processor**  Fig. 2 Source: https://www.oneplus.com/8-pro, Page 6, Last Accessed April 01, 2021, Exhibit B

	Citation 3: Qualcomm Snapdragon 865 supports 4G connectivity **Cellular Technology** **Cellular Technology:** HSPA, WCDMA, TD-SCDMA, CDMA 1x, EV-DO, GSM/EDGE **LTE Technology:** LTE including CBRS support Fig. 3 Source: https://www.qualcomm.com/products/snapdragon-865-5g-mobile-platform, Page 3, Last Accessed April 01, 2021, Exhibit C Qualcomm Snapdragon 865 processor along with X55 RF modem functions on the 3GPP release 15 specifications. In specific, the 3GPP 36.321 is a 4G-based standard that specifies Medium Access Control Protocols and procedures for 4G. The accused product transmits random access preambles comprising a Zadoff-Chu sequence or CAZAC sequence (i.e., signature sequence) randomly selected from one or several root Zadoff-Chu sequences (i.e., a set of signature sequence) as shown in Fig. 4.

Citation 4: Generation of Preambles



5.7.2 Preamble sequence generation

The random access preambles are generated from Zadoff-Chu sequences with zero correlation zone, generated from one or several root Zadoff-Chu sequences. The network configures the set of preamble sequences the UE is allowed to use.

There are 64 preambles available in each cell. The set of 64 preamble sequences in a cell is found by including first, in the order of increasing cyclic shift, all the available cyclic shifts of a root Zadoff-Chu sequence with the logical index RACH_ROOT_SEQUENCE, where RACH_ROOT_SEQUENCE is broadcasted as part of the System Information. Additional preamble sequences, in case 64 preambles cannot be generated from a single root Zadoff-Chu sequence, are obtained from the root sequences with the consecutive logical indexes until all the 64 sequences are found. The logical root sequence order is cyclic: the logical index 0 is consecutive to 837. The relation between a logical root sequence index and physical root sequence index u is given by Tables 5.7.2-4 and 5.7.2-5 for preamble formats 0 – 3 and 4, respectively.

Fig. 4

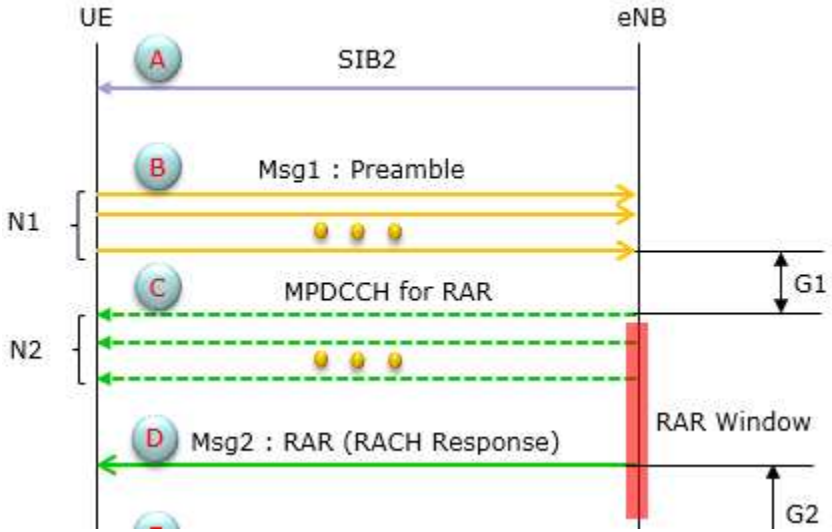
Source:

https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/08.06.00_60/ts_136211v080600p.pdf,

Page 42, Last Accessed April 01, 2021, Exhibit D

The target power value is received from the base station to the UE. Based on the preamble_received_target_power, the UE calculates the transmit power followed by transmitting the random access preambles comprising a Zadoff-Chu sequence (i.e., signature sequence). See Fig. 5.

	Citation 5: Transmission of Preambles 5.1.3 Random Access Preamble transmission The random-access procedure shall be performed as follows: - set PREAMBLE_RECEIVED_TARGET_POWER to *preambleInitialReceivedTargetPower* + DELTA_PREAMBLE + (PREAMBLE_TRANSMISSION_COUNTER – 1) * *powerRampingStep*; - if the UE is a BL UE or a UE in enhanced coverage: - the PREAMBLE_RECEIVED_TARGET_POWER is set to: PREAMBLE_RECEIVED_TARGET_POWER - 10 * log10(*numRepetitionPerPreambleAttempt*); Fig. 5 Source: https://www.etsi.org/deliver/etsi_ts/136300_136399/136321/15.02.00_60/ts_136321v150200p.pdf, Page 24, Last Accessed April 01, 2021, Exhibit E
10b. a processor configured to determine that the access attempt from the first preamble was unsuccessful, and responsive to such determining to cause the transmitter to re-attempt access to the	The accused product comprises a processor configured to determine that the access attempt from the first preamble was unsuccessful, and responsive to such determining to cause the transmitter to re-attempt access to the wireless network by causing the transmitter to send on the random-access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power. A UE according to the *3GPP TS 36.321* standard, after transmitting the preamble waits for the random-access response. If this random-access response is not received within a particular time called RA Response Window, the procedure is considered unsuccessful. See Fig. 6.

wireless network by causing the transmitter to send on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.	**Citation 6: Reception of Random-Access Response**  Fig. 6 Source: https://www.sharetechnote.com/html/Handbook_LTE_BL_CE_RACH.html, Page 5, Last Accessed April 01, 2021, Exhibit F On unsuccessful transmission, the UE attempts to retransmit the preamble (i.e., the second preamble comprising a signature sequence) on RACH (i.e., random access channel) with power (i.e., second transmit power). See Fig. 7.

Citation 7: Transmission Unsuccessful- Preamble Counter

If no Random Access Response is received within the RA Response window, or if none of all received Random Access Responses contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble, the Random Access Response reception is considered not successful and the MAC entity shall:

- if the notification of power ramping suspension has not been received from lower layers:
  - increment PREAMBLE_TRANSMISSION_COUNTER by 1;
- if the UE is an NB-IoT UE, a BL UE or a UE in enhanced coverage:
  - if PREAMBLE_TRANSMISSION_COUNTER = *preambleTransMax-CE* + 1:
    - if the Random Access Preamble is transmitted on the SpCell:
      - indicate a Random Access problem to upper layers;
      - if NB-IoT:
        - consider the Random Access procedure unsuccessfully completed;
- else:
  - if PREAMBLE_TRANSMISSION_COUNTER = *preambleTransMax* + 1:
    - if the Random Access Preamble is transmitted on the SpCell:
      - indicate a Random Access problem to upper layers;
    - if the Random Access Preamble is transmitted on an SCell:
      - consider the Random Access procedure unsuccessfully completed.

Fig. 7

Source:

https://www.etsi.org/deliver/etsi_ts/136300_136399/136321/15.02.00_60/ts_136321v150200p.pdf,

Page 25, Last Accessed April 01, 2021, Exhibit E

On unsuccessful transmission, the UE attempts to retransmit the preamble on RACH with power that is different/same as the first transmit power depending upon the powerrampingstep value. The value of

powerrampingstep can be 0, 2, 4, or 6 dB. When the value of powerrampingstep is 0db (i.e., one of the cases), the first transmit power and second transmit power remains the same (i.e., second transmit power is no greater than the first power). See Fig. 8 and Fig. 9.

Citation 8: Ramping step

Ramping step is broadcast within SIB2 or sent to the UE within an RRC Connection Reconfiguration message. It determines the rate at which the preamble transmit power is increased after receiving no response. The step size can be configured with a value of 0,2,4 or 6 dB.

Fig. 8

Source: http://kiranteja91.blogspot.com/2015/01/lte-rach-procedure.html, Page 3, Last Accessed April 01, 2021, Exhibit G

Citation 9: Power Ramping Step

– *RACH-ConfigCommon*

The IE *RACH-ConfigCommon* is used to specify the generic random access parameters.

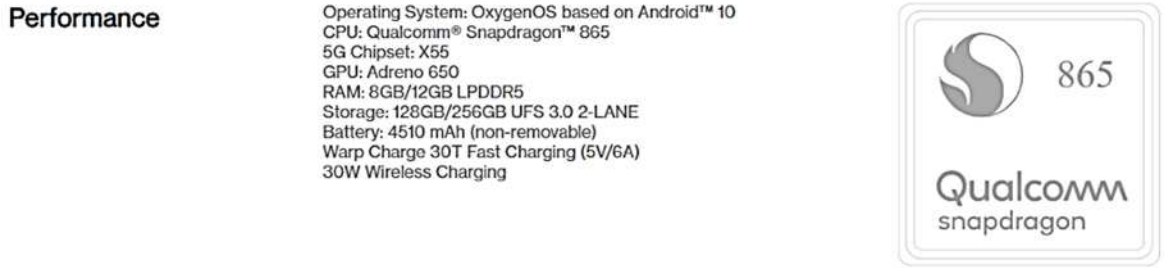
powerRampingStep Power ramping factor in TS 36.321 [6]. Value in dB. Value dB0 corresponds to 0 dB, dB2 corresponds to 2 dB and so on.
preambleInitialReceivedTargetPower Initial preamble power in TS 36.321 [6]. Value in dBm. Value dBm-120 corresponds to -120 dBm, dBm-118 corresponds to -118 dBm and so on.

Fig. 9

Source:

https://www.etsi.org/deliver/etsi_ts/136300_136399/136331/15.03.00_60/ts_136331v150300p.pdf, Page 498, Last Accessed April 01, 2021, Exhibit H

	Once the power ramping step is completed the second preamble is transmitted over the wireless network at the second transmit power. See Fig. 10. **Citation 10: Retransmission of Preambles** 5.1.3 Random Access Preamble transmission The random-access procedure shall be performed as follows: - set PREAMBLE_RECEIVED_TARGET_POWER to *preambleInitialReceivedTargetPower* + DELTA_PREAMBLE + (PREAMBLE_TRANSMISSION_COUNTER – 1) * *powerRampingStep*; - if the UE is a BL UE or a UE in enhanced coverage: - the PREAMBLE_RECEIVED_TARGET_POWER is set to: PREAMBLE_RECEIVED_TARGET_POWER - 10 * log10(*numRepetitionPerPreambleAttempt*); Fig. 10 Source: https://www.etsi.org/deliver/etsi_ts/136300_136399/136321/15.02.00_60/ts_136321v150200p.pdf, Page 24, Last Accessed April 01, 2021, Exhibit E
11Pre. The apparatus according to claim 10, wherein the processor is configured to randomly	The accused product comprises a processor which is configured to randomly select from the set of signature sequences the signature sequence of the first preamble and separately to randomly select from the set of signature sequences the signature sequence of the second preamble.

select from the set of signature sequences the signature sequence of the first preamble and separately to randomly select from the set of signature sequences the signature sequence of the second preamble;	By way of an example, OnePlus 8 Pro comprises of 4G and 5G supported Qualcomm Snapdragon 865 processor along with the Qualcomm Snapdragon X55 Modem-RF system for transmission of signals, as shown in Fig. 11 to Fig. 13. **Citation 11: OnePlus 8 Pro Specifications**  Fig. 11 Source: https://www.oneplus.in/8-pro/specs?from=8pro, Page 2&3, Last Accessed April 01, 2021, Exhibit A

Citation 12: OnePlus 8 Pro Processor

Fig. 12

Source: https://www.oneplus.com/8-pro, Page 6, Last Accessed April 01, 2021, Exhibit B

Citation 13: Qualcomm Snapdragon 865 supports 4G connectivity

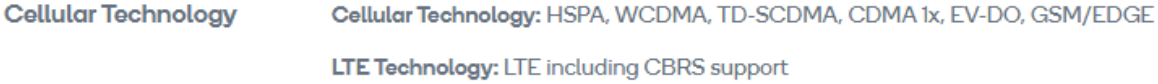


Fig. 13

Source: https://www.qualcomm.com/products/snapdragon-865-5g-mobile-platform, Page 3, Last Accessed April 01, 2021, Exhibit C

Qualcomm Snapdragon 865 processor along with X55 RF modem functions on the 3GPP release 15 specifications. In specific, the 3GPP 36.321 is a 4G-based standard that specifies Medium Access Control Protocols and procedures for 4G.

Zadoff-Chu Sequence is sequence of special numbers, which are used in different kind of technologies like Walsh code in CDMA, OVSF code in WCDMA, etc. Zadoff Chu Sequence has some special properties like constant amplitude and zero autocorrelation. See Fig. 14.

Citation 14: Zadoff-Chu Sequence

Zadoff - Chu Sequence

As the name implies, this is not a single number. It is a sequence of special numbers. You can find quite a lot of materials on this sequence from internet (try with Wikipedia).

Let's first think about how this sequence is generated. Various kinds of number sequences are used in many different kind of technologies (e.g, Walsh code in CDMA, OVSF code in WCDMA) and usually these numbers are created by a special rules or formula. Same to Zadoff-Chu sequence. The basic form of Zadoff chu sequence can be created by the formula as shown in the following spreadsheet (click on the picture to see in magnified view. Please click here if you want to have this spreadsheet).

Followings are the special properties of the sequence :

i) This sequence has a constant amplitude. If you look into the formula, it is in the form of e^(-j theta). You may learned about this in high school math. If you convert this into Euler form, you will get e^(-j theta) = cos(theta) - j sin(theta). First, you will see this is a complex number which is made up of real and imaginary part. If you plot the numbers onto a complex plan (Real part - horizontal axis and Imaginary part on vertical axis), all the numbers will lie on the perimeter of a circle. This means the amplitude of these number is constant. See the plot above. (Column B, C is one example of Zadoff Sequence. B is the real part and C is imaginary part. The plot is the scatter plot of column B, C)

ii) Zero Autocorrelation. If you create a sequence using this formula and create another sequence just by shifting the same sequence by N (N can be 1,2,....,size of sequence -1). And if you take the correlation of the two sequence, the result become 0. Taking the spreadsheet shown above as an example, Column B,C is a sequence created by formula. and Column D,E is not the one created by the formula.. it is just shifted version of Column B, C. Cell F70 and G70 shows the correlation of Column B,C and D,E which gives almost 0. It should be 0 theoretically, but the F70,G70 is not exactly 0 because of numerical errors.. but it is almost 0. If you have two sequence of number and the correlation of the two sequence is 0, we say "the two sequences are orthogonal to each other". It means that you can create many of orthogonal sequences just by shifting a Zadoff Chu sequence. How convenient it is to create orthogonal sequences.. and you know how important to create orthogonal sequences in many wireless communication.

Fig. 14

	Source: http://www.sharetechnote.com/html/Handbook_LTE_Zadoff_Chu_Sequence.html, Page 1, Last Accessed on April 01, 2021, Exhibit I The accused product transmits random access preambles comprising a Zadoff-Chu sequence or CAZAC sequence (i.e., signature sequence) randomly selected from one or several root Zadoff-Chu sequences (i.e., a set of signature sequence) as shown in Fig. 15. By way of an example, the processor comprised with the accused product selects a Zadoff-Chu sequence or CAZAC sequence (i.e., signature sequence of the first preamble) randomly selected from one or several root Zadoff-Chu sequences (i.e., a set of signature sequence). Additional preamble sequences cannot be generated from the single root Zadoff-Chu sequence, but are obtained from the root sequences with the consecutive logical indexes. On the unsuccessful attempt of transmitting the first preamble, the processor again selects a Zadoff-Chu sequence or CAZAC sequence (i.e., signature sequence of the second preamble) from one or several root Zadoff-Chu sequences (i.e., a set of signature sequence). There is a possibility that the second signature sequence can be selected from the first set of signature sequence or any random set of signature sequence.

	Citation 15: Generation of Preambles 5.7.2 Preamble sequence generation The random access preambles are generated from Zadoff-Chu sequences with zero correlation zone, generated from one or several root Zadoff-Chu sequences. The network configures the set of preamble sequences the UE is allowed to use. There are 64 preambles available in each cell. The set of 64 preamble sequences in a cell is found by including first, in the order of increasing cyclic shift, all the available cyclic shifts of a root Zadoff-Chu sequence with the logical index RACH_ROOT_SEQUENCE, where RACH_ROOT_SEQUENCE is broadcasted as part of the System Information. Additional preamble sequences, in case 64 preambles cannot be generated from a single root Zadoff-Chu sequence, are obtained from the root sequences with the consecutive logical indexes until all the 64 sequences are found. The logical root sequence order is cyclic: the logical index 0 is consecutive to 837. The relation between a logical root sequence index and physical root sequence index u is given by Tables 5.7.2-4 and 5.7.2-5 for preamble formats 0 – 3 and 4, respectively. Fig. 15 Source: https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/08.06.00_60/ts_136211v080600p.pdf, Page 42, Last Accessed April 01, 2021, Exhibit D
11a. and wherein the processor is configured to determine that the access attempt from the first preamble was unsuccessful by tuning a receiver of the apparatus to monitor an acquisition channel of the wireless network	The accused product comprises a processor which is configured to determine that the access attempt from the first preamble was unsuccessful by tuning a receiver of the apparatus to monitor an acquisition channel of the wireless network and determining that no acquisition indicator that corresponds to the sent first preamble was received at the receiver on the acquisition channel. By way of an example, OnePlus 8 Pro comprises of 4G and 5G supported Qualcomm Snapdragon 865 processor along with the Qualcomm Snapdragon X55 Modem-RF system for transmission/reception of signals, as shown in Fig. 16 to Fig. 18.

and determining that no acquisition indicator that corresponds to the sent first preamble was received at the receiver on the acquisition channel.	**Citation 16: OnePlus 8 Pro Specifications** **Performance** Operating System: OxygenOS based on Android™ 10 CPU: Qualcomm® Snapdragon™ 865 5G Chipset: X55 GPU: Adreno 650 RAM: 8GB/12GB LPDDR5 Storage: 128GB/256GB UFS 3.0 2-LANE Battery: 4510 mAh (non-removable) Warp Charge 30T Fast Charging (5V/6A) 30W Wireless Charging Fig. 16 Source: https://www.oneplus.in/8-pro/specs?from=8pro, Page 2&3, Last Accessed April 01, 2021, Exhibit A

Citation 17: OnePlus 8 Pro Processor

Fig. 17

Source: https://www.oneplus.com/8-pro, Page 6, Last Accessed April 01, 2021, Exhibit B

Citation 18: Qualcomm Snapdragon 865 supports 4G connectivity

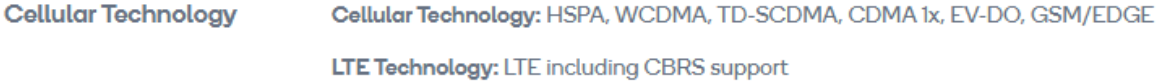


Fig. 18

Source: https://www.qualcomm.com/products/snapdragon-865-5g-mobile-platform, Page 3, Last Accessed April 01, 2021, Exhibit C

	Qualcomm Snapdragon 865 processor along with X55 RF modem functions on the 3GPP release 15 specifications. In specific, the 3GPP 36.321 is a 4G-based standard that specifies Medium Access Control Protocols and procedures for 4G. A UE, according to the *3GPP TS 36.321* standard, after transmitting the preamble, waits for the random-access response. If this random-access response is not received (i.e., no acquisition indicator that corresponds to the sent first preamble was received) within a particular time called RA Response Window, the procedure is considered unsuccessful. See Fig. 19 and Fig. 20. By way of an example, the processor installed in the accused product monitors the flow of messages between UE (i.e., the accused product) and eNB (i.e., base station) via MPDCHH and PDSCH (i.e., acquisition channel). I f within a particular time the response is not received by the receiver (i.e., tuning a receiver of the apparatus), the procedure is considered unsuccessful.

Citation 19: Reception of Random-Access Response

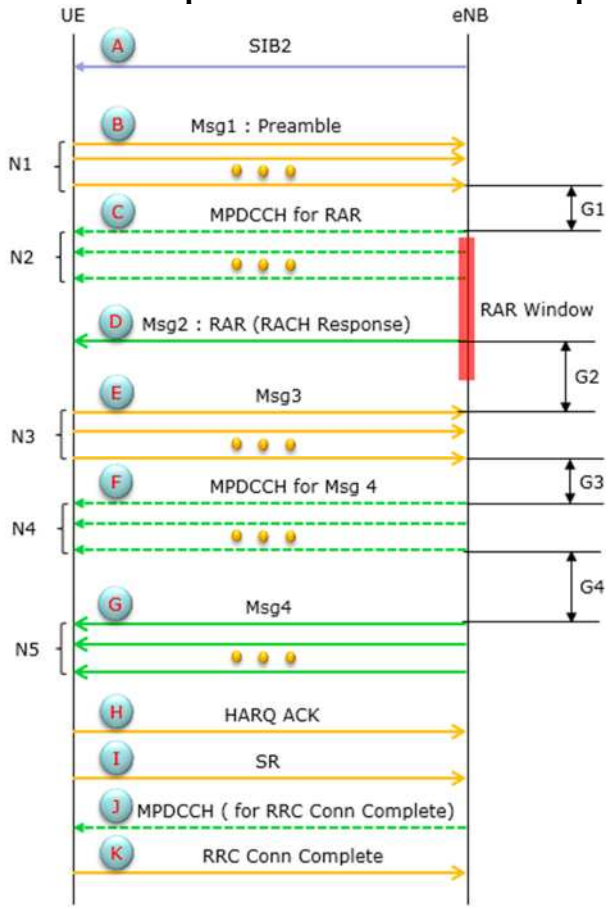


Fig. 19

Source: https://www.sharetechnote.com/html/Handbook_LTE_BL_CE_RACH.html, Page 5, Last Accessed April 01, 2021, Exhibit F

	Citation 20: Monitoring an acquisition channel As soon as UE transmit the Msg3(RRC Connection Request), UE start monitoring (trying to detect) the MPDCCH that is needed to receive Msg4 PDSCH (i.e, the PDSCH carrying Msg4). For UE to properly decode this channel, it has to know of following params. Fig. 20 Source: https://www.sharetechnote.com/html/Handbook_LTE_BL_CE_RACH.html, Page 8, Last Accessed April 01, 2021, Exhibit F
12Pre. The apparatus according to claim 11: **12a.** wherein the receiver is configured to receive from higher layers parameters for an initial power for random access; and	The accused product comprises a processor wherein the receiver is configured to receive from higher layers parameters for an initial power for random access. By way of an example, OnePlus 8 Pro comprises of 4G and 5G supported Qualcomm Snapdragon 865 processor along with the Qualcomm Snapdragon X55 Modem-RF system for transmission/reception of signals, as shown in Fig. 21 to Fig. 23.

Citation 21: OnePlus 8 Pro Specifications

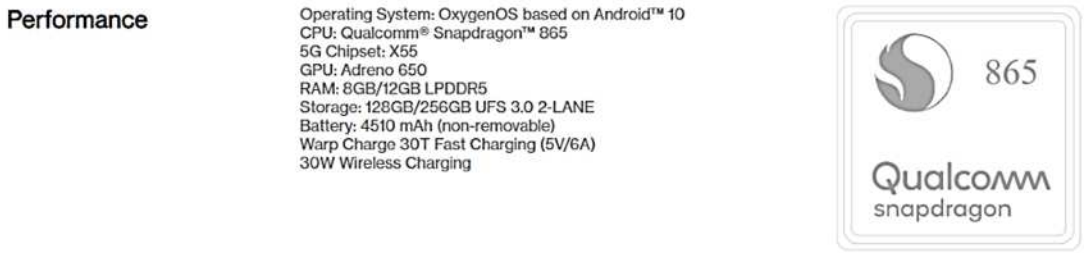


Fig. 21

Source: https://www.oneplus.in/8-pro/specs?from=8pro, Page 2&3, Last Accessed April 01, 2021, Exhibit A

Citation 22: OnePlus 8 Pro Processor

Fig. 22

	Source: https://www.oneplus.com/8-pro, Page 6, Last Accessed April 01, 2021, Exhibit B **Citation 23: Qualcomm Snapdragon 865 supports 4G connectivity** Cellular Technology **Cellular Technology:** HSPA, WCDMA, TD-SCDMA, CDMA 1x, EV-DO, GSM/EDGE **LTE Technology:** LTE including CBRS support Fig. 23 Source: https://www.qualcomm.com/products/snapdragon-865-5g-mobile-platform, Page 3, Last Accessed April 01, 2021, Exhibit C Qualcomm Snapdragon 865 processor along with X55 RF modem functions on the 3GPP release 15 specifications. In specific, the 3GPP 36.321 is a 4G-based standard that specifies Medium Access Control Protocols and procedures for 4G. The receiver installed in UE (i.e., the accused product) is configured by the upper layers to receive preambleInitialReceivedTargetPower (i.e., parameters for an initial power for random access). See Fig. 24.

	Citation 24: Power attribute for Random Access
	5.1.3 Random Access Preamble transmission
	The random-access procedure shall be performed as follows:
	- set PREAMBLE_RECEIVED_TARGET_POWER to *preambleInitialReceivedTargetPower* + DELTA_PREAMBLE + (PREAMBLE_TRANSMISSION_COUNTER – 1) * *powerRampingStep*;
	- if the UE is a BL UE or a UE in enhanced coverage:
	  - the PREAMBLE_RECEIVED_TARGET_POWER is set to: PREAMBLE_RECEIVED_TARGET_POWER - 10 * log10(*numRepetitionPerPreambleAttempt*);
	- if the UE is an NB-IoT UE:
	  - for enhanced coverage level 0, the PREAMBLE_RECEIVED_TARGET_POWER is set to: PREAMBLE_RECEIVED_TARGET_POWER - 10 * log10(*numRepetitionPerPreambleAttempt*)
	  - for other enhanced coverage levels:
	  - if the UE supports enhanced random access power control and *PowerRampingParameters-NB-v1450* is configured by upper layers; and
	  - if the starting enhanced coverage level was enhanced coverage level 0 or enhanced coverage level 1:
	  - if the MAC entity considers itself to be in enhanced coverage level 1 and if *powerRampingStepCE1* and *preambleInitialReceivedTargetPowerCE1* have been configured by upper layers:
	  - the PREAMBLE_RECEIVED_TARGET_POWER is set to *preambleInitialReceivedTargetPowerCE1* + DELTA_PREAMBLE + (PREAMBLE_TRANSMISSION_COUNTER_CE – 1) * *powerRampingStepCE1* - 10 * log10(*numRepetitionPerPreambleAttempt*);
	  - the MSG3_RECEIVED_TARGET_POWER is set to *preambleInitialReceivedTargetPowerCE1* + (PREAMBLE_TRANSMISSION_COUNTER_CE – 1) * *powerRampingStepCE1*;
	Fig. 24
	Source: https://www.etsi.org/deliver/etsi_ts/136300_136399/136321/15.02.00_60/ts_136321v150200p.pdf, Page 24, Last Accessed April 01, 2021, Exhibit E

12b. the apparatus further comprises a	The accused product comprises a memory storing the received parameters.

<table>
<tr>
<td>memory storing the received parameters;</td>
<td>OnePlus 8 Pro comprises RAM and ROM for various storage purposes. See Fig. 25.

Citation 25: OnePlus 8 Pro Specifications

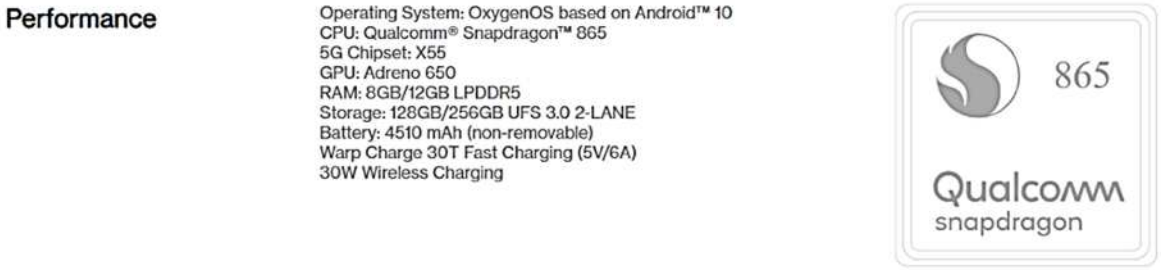
 

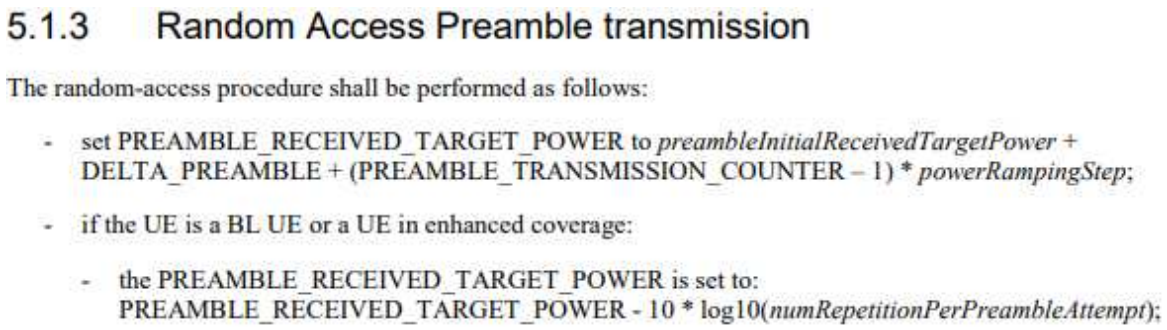
Fig. 25

Source: https://www.oneplus.in/8-pro/specs?from=8pro, Page 2&3, Last Accessed April 01, 2021, Exhibit A</td>
</tr>
<tr>
<td>12c. and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the first transmit power is equal to the second transmit</td>
<td>The accused product comprises a processor which is configured to determine from the parameters the initial power for random access, and wherein the first transmit power is equal to the second transmit power which is equal to the determined initial power.

On unsuccessful transmission, the UE attempts to retransmit the preamble (i.e., the second preamble comprising a signature sequence) on RACH (i.e., random access channel) with power (i.e., second transmit power). See Fig. 26 and Fig. 27.</td>
</tr>
</table>

power which is equal to the determined initial power.	**Citation 26: Transmission Unsuccessful**
	
	If no Random Access Response is received within the RA Response window, or if none of all received Random Access Responses contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble, the Random Access Response reception is considered not successful and the MAC entity shall:
	- if the notification of power ramping suspension has not been received from lower layers:
	  - increment PREAMBLE_TRANSMISSION_COUNTER by 1;
	- if the UE is an NB-IoT UE, a BL UE or a UE in enhanced coverage:
	  - if PREAMBLE_TRANSMISSION_COUNTER = *preambleTransMax-CE* + 1:
	  - if the Random Access Preamble is transmitted on the SpCell:
	  - indicate a Random Access problem to upper layers;
	  - if NB-IoT:
	  - consider the Random Access procedure unsuccessfully completed;
	- else:
	  - if PREAMBLE_TRANSMISSION_COUNTER = *preambleTransMax* + 1:
	  - if the Random Access Preamble is transmitted on the SpCell:
	  - indicate a Random Access problem to upper layers;
	  - if the Random Access Preamble is transmitted on an SCell:
	  - consider the Random Access procedure unsuccessfully completed.
	
	Fig. 26
	
	Source: https://www.etsi.org/deliver/etsi_ts/136300_136399/136321/15.02.00_60/ts_136321v150200p.pdf, Page 25, Last Accessed April 01, 2021, Exhibit E

Citation 27: Retransmission of Preambles



5.1.3 Random Access Preamble transmission

The random-access procedure shall be performed as follows:

- set PREAMBLE_RECEIVED_TARGET_POWER to *preambleInitialReceivedTargetPower* + DELTA_PREAMBLE + (PREAMBLE_TRANSMISSION_COUNTER – 1) * *powerRampingStep*;
- if the UE is a BL UE or a UE in enhanced coverage:
  - the PREAMBLE_RECEIVED_TARGET_POWER is set to: PREAMBLE_RECEIVED_TARGET_POWER - 10 * log10(*numRepetitionPerPreambleAttempt*);

Fig. 27

Source: https://www.etsi.org/deliver/etsi_ts/136300_136399/136321/15.02.00_60/ts_136321v150200p.pdf, Page 24, Last Accessed April 01, 2021, Exhibit E

For establishing the connection, UE transmits a preamble (i.e., first preamble) on RACH (i.e., random access channel) with power (i.e., first transmit power) that is different/same as the initial transmit power depending upon the powerrampingstep value. The value of powerrampingstep can be 0, 2, 4, or 6 dB. When the value of powerrampingstep is 0db (i.e., one of the cases), the first transmit power and initial transmit power remain the same. On unsuccessful transmission, the UE attempts to retransmit the preamble (i.e., second preamble) with power (i.e., second transmit power) that is different/same as the first transmit power depending upon the powerrampingstep value. The value of powerrampingstep can be 0, 2, 4, or 6 dB. When the value of powerrampingstep is 0db (i.e., one of the cases), the first transmit power and second transmit power remains the same. There may be a case in which initial transmit power is equal to both the first and the second transmit power. See Fig. 28 and Fig. 29

Citation 28: Ramping Step

Ramping step is broadcast within SIB2 or sent to the UE within an RRC Connection Reconfiguration message. It determines the rate at which the preamble transmit power is increased after receiving no response. The step size can be configured with a value of 0,2,4 or 6 dB.

Fig. 28

Source: http://kiranteja91.blogspot.com/2015/01/lte-rach-procedure.html, Page 3, Last Accessed April 01, 2021, Exhibit G

Citation 29: Power Ramping Step

– *RACH-ConfigCommon*

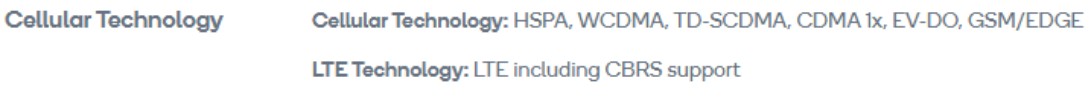
The IE *RACH-ConfigCommon* is used to specify the generic random access parameters.

powerRampingStep Power ramping factor in TS 36.321 [6]. Value in dB. Value dB0 corresponds to 0 dB, dB2 corresponds to 2 dB and so on.
preambleInitialReceivedTargetPower Initial preamble power in TS 36.321 [6]. Value in dBm. Value dBm-120 corresponds to -120 dBm, dBm-118 corresponds to -118 dBm and so on.

Fig. 29

Source: https://www.etsi.org/deliver/etsi_ts/136300_136399/136331/15.03.00_60/ts_136331v150300p.pdf, Page 498, Last Accessed April 01, 2021, Exhibit H

14Pre. The apparatus according to claim 11: **14a.** wherein the processor is configured to determine that the access re-attempt from the second preamble was unsuccessful, and responsive to such determining to cause the transmitter to again re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the	The accused product comprises a processor which is configured to determine that the access re-attempt from the second preamble was unsuccessful, and responsive to such determining to cause the transmitter to again re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power. By way of an example, OnePlus 8 Pro comprises of 4G and 5G supported Qualcomm Snapdragon 865 processor along with the Qualcomm Snapdragon X55 Modem-RF system for transmission/reception of signals, as shown in Fig. 30 to Fig. 32. **Citation 30: OnePlus 8 Pro Specifications** **Performance** Operating System: OxygenOS based on Android™ 10 CPU: Qualcomm® Snapdragon™ 865 5G Chipset: X55 GPU: Adreno 650 RAM: 8GB/12GB LPDDR5 Storage: 128GB/256GB UFS 3.0 2-LANE Battery: 4510 mAh (non-removable) Warp Charge 30T Fast Charging (5V/6A) 30W Wireless Charging 865 Qualcomm snapdragon Fig. 30 Source: https://www.oneplus.in/8-pro/specs?from=8pro, Page 2&3, Last Accessed April 01, 2021, Exhibit A

third transmit power is greater than the first transmit power and greater than the second transmit power;	**Citation 31: OnePlus 8 Pro Processor**  Fig. 31 Source: https://www.oneplus.com/8-pro, Page 6, Last Accessed April 01, 2021, Exhibit B **Citation 32: Qualcomm Snapdragon 865 supports 4G connectivity**  Fig. 32 Source: https://www.qualcomm.com/products/snapdragon-865-5g-mobile-platform, Page 3, Last Accessed April 01, 2021, Exhibit C

	Qualcomm Snapdragon 865 processor along with X55 RF modem functions on the 3GPP release 15 specifications. In specific, the 3GPP 36.321 is a 4G-based standard that specifies Medium Access Control Protocols and procedures for 4G. A UE according to the *3GPP TS 36.321* standard, after transmitting the preamble, waits for the random-access response. If this random-access response is not received within a particular time called RA Response Window, the procedure is considered unsuccessful. See Fig. 33.

Citation 33: Reception of Random-Access Response

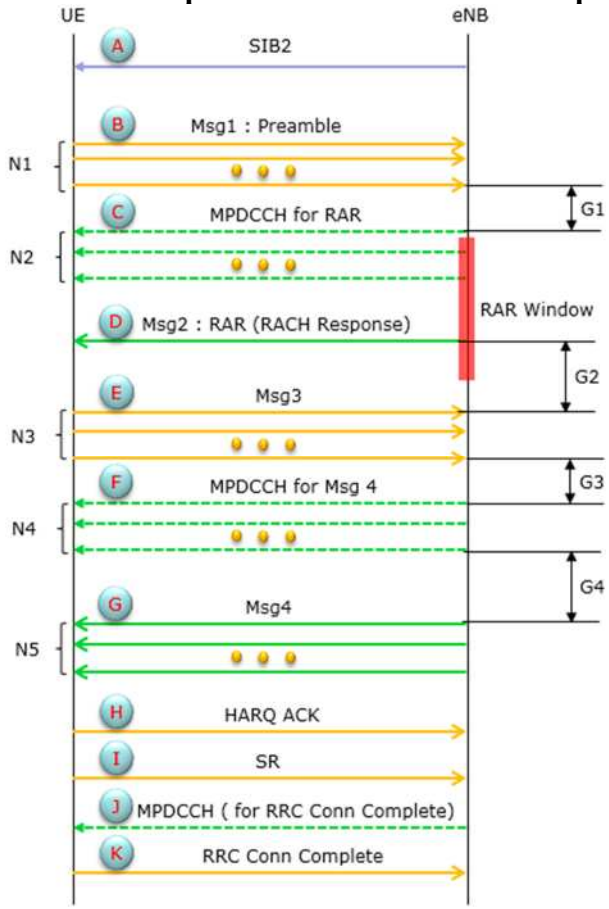


Fig. 33

Source: https://www.sharetechnote.com/html/Handbook_LTE_BL_CE_RACH.html, Page 5, Last Accessed April 01, 2021, Exhibit F

	On unsuccessful transmission, the UE attempts to retransmit the preamble (i.e., the third preamble comprising a signature sequence) on RACH (i.e., random access channel) with power (i.e., third transmit power) that is different/same as the first transmit power depending upon the powerrampingstep value. The value of powerrampingstep can be 0, 2, 4, or 6 dB. See Fig. 34 to Fig. 37. By way of an example, when the value of powerrampingstep is 0db while going from the first transmit power to the second transmit power, and the value of powerrampingstep is 2db while going from the second transmit power to the third transmit power, then the third transmit power is greater than both the first transmit power and the second transmit power.

Citation 34: Transmission Unsuccessful

If no Random Access Response is received within the RA Response window, or if none of all received Random Access Responses contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble, the Random Access Response reception is considered not successful and the MAC entity shall:

- if the notification of power ramping suspension has not been received from lower layers:
  - increment PREAMBLE_TRANSMISSION_COUNTER by 1;
- if the UE is an NB-IoT UE, a BL UE or a UE in enhanced coverage:
  - if PREAMBLE_TRANSMISSION_COUNTER = *preambleTransMax-CE* + 1:
    - if the Random Access Preamble is transmitted on the SpCell:
      - indicate a Random Access problem to upper layers;
      - if NB-IoT:
        - consider the Random Access procedure unsuccessfully completed;
- else:
  - if PREAMBLE_TRANSMISSION_COUNTER = *preambleTransMax* + 1:
    - if the Random Access Preamble is transmitted on the SpCell:
      - indicate a Random Access problem to upper layers;
    - if the Random Access Preamble is transmitted on an SCell:
      - consider the Random Access procedure unsuccessfully completed.

Fig. 34

Source:

https://www.etsi.org/deliver/etsi_ts/136300_136399/136321/15.02.00_60/ts_136321v150200p.pdf,

Page 25, Last Accessed April 01, 2021, Exhibit E

Citation 35: Retransmission of Preambles

5.1.3 Random Access Preamble transmission

The random-access procedure shall be performed as follows:

- set PREAMBLE_RECEIVED_TARGET_POWER to *preambleInitialReceivedTargetPower* + DELTA_PREAMBLE + (PREAMBLE_TRANSMISSION_COUNTER – 1) * *powerRampingStep*;
- if the UE is a BL UE or a UE in enhanced coverage:
  - the PREAMBLE_RECEIVED_TARGET_POWER is set to: PREAMBLE_RECEIVED_TARGET_POWER - 10 * log10(*numRepetitionPerPreambleAttempt*);

Fig. 35

Source:

https://www.etsi.org/deliver/etsi_ts/136300_136399/136321/15.02.00_60/ts_136321v150200p.pdf,

Page 24, Last Accessed April 01, 2021, Exhibit E

Citation 36: Ramping step

Ramping step is broadcast within SIB2 or sent to the UE within an RRC Connection Reconfiguration message. It determines the rate at which the preamble transmit power is increased after receiving no response. The step size can be configured with a value of 0,2,4 or 6 dB.

Fig. 36

Source: http://kiranteja91.blogspot.com/2015/01/lte-rach-procedure.html, Page 3, Last Accessed April 01, 2021, Exhibit G

	Citation 37: Power Ramping Step – *RACH-ConfigCommon* The IE *RACH-ConfigCommon* is used to specify the generic random access parameters. ***powerRampingStep*** Power ramping factor in TS 36.321 [6]. Value in dB. Value dB0 corresponds to 0 dB, dB2 corresponds to 2 dB and so on. ***preambleInitialReceivedTargetPower*** Initial preamble power in TS 36.321 [6]. Value in dBm. Value dBm-120 corresponds to -120 dBm, dBm-118 corresponds to -118 dBm and so on. Fig. 37 Source: https://www.etsi.org/deliver/etsi_ts/136300_136399/136331/15.03.00_60/ts_136331v150300p.pdf, Page 498, Last Accessed April 01, 2021, Exhibit H
14b. and wherein the processor is configured to randomly select from the set of signature sequences, separately, the signature sequence of the first, second and third preambles.	The accused product comprises a processor which is configured to randomly select from the set of signature sequences, separately, the signature sequence of the first, second and third preambles. The accused product transmits random access preambles comprising a Zadoff-Chu sequence or CAZAC sequence (i.e., signature sequence) randomly selected from one or several root Zadoff-Chu sequences (i.e., a set of signature sequence) as shown in Fig. 38/ By way of an example, the processor comprised with the accused product selects a Zadoff-Chu sequence or CAZAC sequence (i.e., signature sequence of the first preamble) randomly selected from one or several root Zadoff-Chu sequences (i.e., a set of signature sequence). Additional preamble

sequences cannot be generated from the single root Zadoff-Chu sequence but are obtained from the root sequences with the consecutive logical indexes. On the unsuccessful attempt of transmitting the first preamble, the processor again selects a Zadoff-Chu sequence or CAZAC sequence (i.e., signature sequence of the second preamble) randomly selected from one or several root Zadoff-Chu sequences (i.e., a set of signature sequence). The same procedure happens for the third preamble.

There is a possibility that the second and the third signature sequence can be selected from the first set of signature sequence or any random set of signature sequence.

Citation 38: Generation of Preambles

5.7.2 Preamble sequence generation

The random access preambles are generated from Zadoff-Chu sequences with zero correlation zone, generated from one or several root Zadoff-Chu sequences. The network configures the set of preamble sequences the UE is allowed to use.

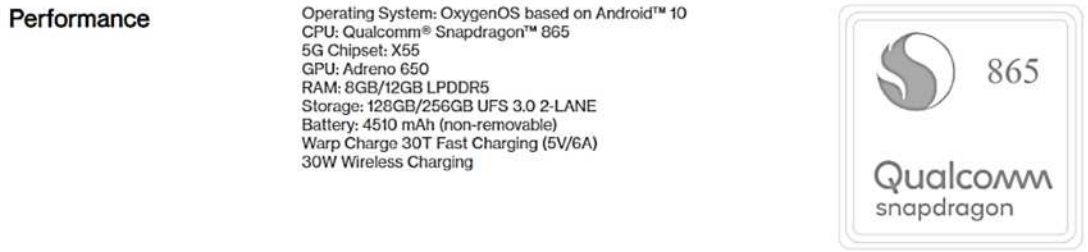
There are 64 preambles available in each cell. The set of 64 preamble sequences in a cell is found by including first, in the order of increasing cyclic shift, all the available cyclic shifts of a root Zadoff-Chu sequence with the logical index RACH_ROOT_SEQUENCE, where RACH_ROOT_SEQUENCE is broadcasted as part of the System Information. Additional preamble sequences, in case 64 preambles cannot be generated from a single root Zadoff-Chu sequence, are obtained from the root sequences with the consecutive logical indexes until all the 64 sequences are found. The logical root sequence order is cyclic: the logical index 0 is consecutive to 837. The relation between a logical root sequence index and physical root sequence index u is given by Tables 5.7.2-4 and 5.7.2-5 for preamble formats 0 – 3 and 4, respectively.

Fig. 38

Source: https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/08.06.00_60/ts_136211v080600p.pdf, Page 42, Last Accessed April 01, 2021, Exhibit D

15a. wherein the processor is configured to randomly select from the set of signature sequences the signature sequence of the first preamble and to store the selected signature sequence in the memory; **15b.** and wherein the signature sequence of the second preamble is the selected signature sequence of the first preamble retrieved from the memory;	The accused product comprises a processor wherein the processor is configured to randomly select from the set of signature sequences the signature sequence of the first preamble and to store the selected signature sequence in the memory and the signature sequence of the second preamble is the selected signature sequence of the first preamble retrieved from the memory. *Refer to supporting evidence of claim element 11[Pre].*
15c. and wherein the processor is configured	The accused product comprises a processor wherein the processor is configured to determine that the access attempt from the first preamble was unsuccessful by tuning a receiver of the apparatus to monitor

to determine that the access attempt from the first preamble was unsuccessful by tuning a receiver of the apparatus to monitor an acquisition channel of the wireless network and determining that no acquisition indicator that corresponds to the sent first preamble was received at the receiver on the acquisition channel.	an acquisition channel of the wireless network and determining that no acquisition indicator that corresponds to the sent first preamble was received at the receiver on the acquisition channel. *Refer to supporting evidence of claim element 11[a].*
16Pre. The apparatus according to claim 15: **16a.** wherein the receiver is configured to receive from higher	The accused product comprises a processor wherein the receiver is configured to receive from higher layers parameters for an initial power for random access. By way of an example, OnePlus 8 Pro comprises of 4G and 5G supported Qualcomm Snapdragon 865 processor along with the Qualcomm Snapdragon X55 Modem-RF system for transmission/reception of signals, as shown in Fig. 39 to Fig. 41.

layers parameters for an initial power for random access; and	**Citation 39: OnePlus 8 Pro Specifications**  Fig. 39 Source: https://www.oneplus.in/8-pro/specs?from=8pro, Page 2&3, Last Accessed April 01, 2021, Exhibit A

Citation 40: OnePlus 8 Pro Processor

Fig. 40

Source: https://www.oneplus.com/8-pro, Page 6, Last Accessed April 01, 2021, Exhibit B

Citation 41: Qualcomm Snapdragon 865 supports 4G connectivity

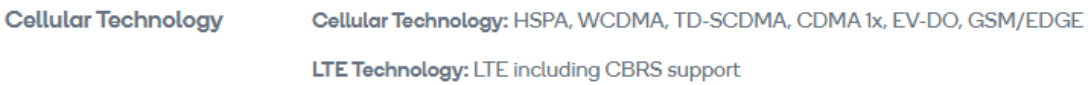


Fig. 41

Source: https://www.qualcomm.com/products/snapdragon-865-5g-mobile-platform, Page 3, Last Accessed April 01, 2021, Exhibit C

	Qualcomm Snapdragon 865 processor along with X55 RF modem functions on the 3GPP release 15 specifications. In specific, the 3GPP 36.321 is a 4G-based standard that specifies Medium Access Control Protocols and procedures for 4G. The receiver installed in UE (i.e., the accused product) is configured by the upper layers to receive preambleInitialReceivedTargetPower (i.e., parameters for an initial power for random access). See Fig. 42.

	Citation 42: Power attribute for Random Access
	5.1.3 Random Access Preamble transmission
	The random-access procedure shall be performed as follows:
	- set PREAMBLE_RECEIVED_TARGET_POWER to *preambleInitialReceivedTargetPower* + DELTA_PREAMBLE + (PREAMBLE_TRANSMISSION_COUNTER – 1) * *powerRampingStep*;
	- if the UE is a BL UE or a UE in enhanced coverage:
	  - the PREAMBLE_RECEIVED_TARGET_POWER is set to: PREAMBLE_RECEIVED_TARGET_POWER - 10 * log10(*numRepetitionPerPreambleAttempt*);
	- if the UE is an NB-IoT UE:
	  - for enhanced coverage level 0, the PREAMBLE_RECEIVED_TARGET_POWER is set to: PREAMBLE_RECEIVED_TARGET_POWER - 10 * log10(*numRepetitionPerPreambleAttempt*)
	  - for other enhanced coverage levels:
	  - if the UE supports enhanced random access power control and *PowerRampingParameters-NB-v1450* is configured by upper layers; and
	  - if the starting enhanced coverage level was enhanced coverage level 0 or enhanced coverage level 1:
	  - if the MAC entity considers itself to be in enhanced coverage level 1 and if *powerRampingStepCE1* and *preambleInitialReceivedTargetPowerCE1* have been configured by upper layers:
	  - the PREAMBLE_RECEIVED_TARGET_POWER is set to *preambleInitialReceivedTargetPowerCE1* + DELTA_PREAMBLE + (PREAMBLE_TRANSMISSION_COUNTER_CE – 1) * *powerRampingStepCE1* - 10 * log10(*numRepetitionPerPreambleAttempt*);
	  - the MSG3_RECEIVED_TARGET_POWER is set to *preambleInitialReceivedTargetPowerCE1* + (PREAMBLE_TRANSMISSION_COUNTER_CE – 1) * *powerRampingStepCE1*;
	Fig. 42
	Source: https://www.etsi.org/deliver/etsi_ts/136300_136399/136321/15.02.00_60/ts_136321v150200p.pdf, Page 24, Last Accessed April 01, 2021, Exhibit E

16b. the apparatus further comprises a	The accused product comprises a memory storing the parameters.

<table>
<tr>
<td>memory storing the parameters;</td>
<td>OnePlus 8 Pro comprises RAM and ROM for various storage purposes. See Fig. 43

Citation 43: OnePlus 8 Pro Specifications

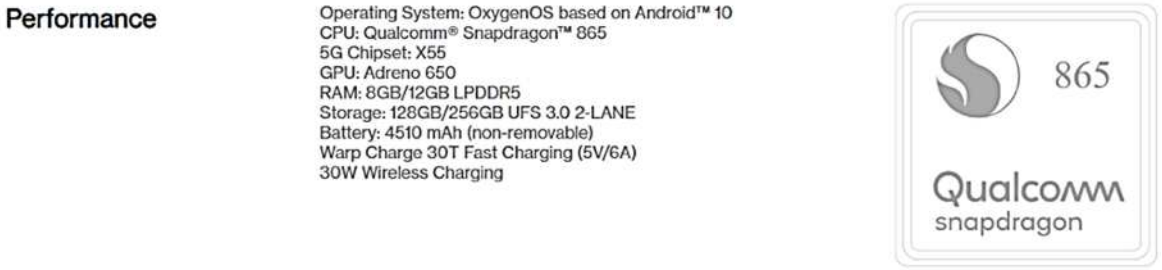
 

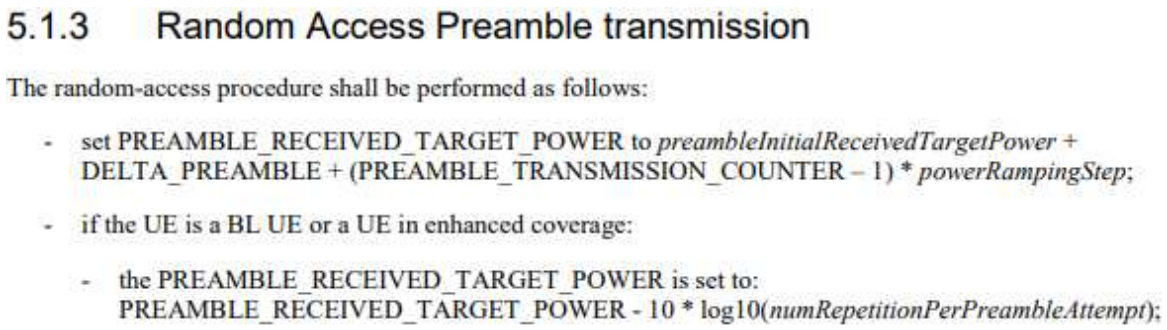
Fig. 43

Source: https://www.oneplus.in/8-pro/specs?from=8pro, Page 2&3, Last Accessed April 01, 2021, Exhibit A</td>
</tr>
<tr>
<td>16c. and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the first transmit power is equal to the second transmit</td>
<td>The accused product comprises a processor which is configured to determine from the parameters the initial power for random access, and wherein the first transmit power is equal to the second transmit power which is equal to the initial power.

On unsuccessful transmission, the UE attempts to retransmit the preamble (i.e., the second preamble comprising a signature sequence) on RACH (i.e., random access channel) with power (i.e., second transmit power). See Fig. 44 and Fig. 45.</td>
</tr>
</table>

power which is equal to the initial power.	**Citation 44: Transmission Unsuccessful**
	
	If no Random Access Response is received within the RA Response window, or if none of all received Random Access Responses contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble, the Random Access Response reception is considered not successful and the MAC entity shall:
	- if the notification of power ramping suspension has not been received from lower layers:
	  - increment PREAMBLE_TRANSMISSION_COUNTER by 1;
	- if the UE is an NB-IoT UE, a BL UE or a UE in enhanced coverage:
	  - if PREAMBLE_TRANSMISSION_COUNTER = *preambleTransMax-CE* + 1:
	  - if the Random Access Preamble is transmitted on the SpCell:
	  - indicate a Random Access problem to upper layers;
	  - if NB-IoT:
	  - consider the Random Access procedure unsuccessfully completed;
	- else:
	  - if PREAMBLE_TRANSMISSION_COUNTER = *preambleTransMax* + 1:
	  - if the Random Access Preamble is transmitted on the SpCell:
	  - indicate a Random Access problem to upper layers;
	  - if the Random Access Preamble is transmitted on an SCell:
	  - consider the Random Access procedure unsuccessfully completed.
	
	Fig. 44
	
	Source: https://www.etsi.org/deliver/etsi_ts/136300_136399/136321/15.02.00_60/ts_136321v150200p.pdf, Page 25, Last Accessed April 01, 2021, Exhibit E

Citation 45: Retransmission of Preambles



5.1.3 Random Access Preamble transmission

The random-access procedure shall be performed as follows:

- set PREAMBLE_RECEIVED_TARGET_POWER to *preambleInitialReceivedTargetPower* + DELTA_PREAMBLE + (PREAMBLE_TRANSMISSION_COUNTER – 1) * *powerRampingStep*;
- if the UE is a BL UE or a UE in enhanced coverage:
  - the PREAMBLE_RECEIVED_TARGET_POWER is set to: PREAMBLE_RECEIVED_TARGET_POWER - 10 * log10(*numRepetitionPerPreambleAttempt*);

Fig. 45

Source: https://www.etsi.org/deliver/etsi_ts/136300_136399/136321/15.02.00_60/ts_136321v150200p.pdf, Page 24, Last Accessed April 01, 2021, Exhibit E

For establishing the connection, UE transmits a preamble (i.e., first preamble) on RACH (i.e., random access channel) with power (i.e., first transmit power) that is different/same as the initial transmit power depending upon the powerrampingstep value. The value of powerrampingstep can be 0, 2, 4, or 6 dB. When the value of powerrampingstep is 0db (i.e., one of the cases), the first transmit power and initial transmit power remain the same. On unsuccessful transmission, the UE attempts to retransmit the preamble (i.e., second preamble) with power (i.e., second transmit power) that is different/same as the first transmit power depending upon the powerrampingstep value. The value of powerrampingstep can be 0, 2, 4, or 6 dB. When the value of powerrampingstep is 0db (i.e., one of the cases), the first transmit power and second transmit power remains the same. There may be a case in which initial transmit power is equal to both the first and the second transmit power. See Fig. 46 and Fig. 47.

Citation 46: Ramping Step

Ramping step is broadcast within SIB2 or sent to the UE within an RRC Connection Reconfiguration message. It determines the rate at which the preamble transmit power is increased after receiving no response. The step size can be configured with a value of 0,2,4 or 6 dB.

Fig. 46

Source: http://kiranteja91.blogspot.com/2015/01/lte-rach-procedure.html, Page 3, Last Accessed April 01, 2021, Exhibit G

Citation 47: Power Ramping Step

– *RACH-ConfigCommon*

The IE *RACH-ConfigCommon* is used to specify the generic random access parameters.

powerRampingStep Power ramping factor in TS 36.321 [6]. Value in dB. Value dB0 corresponds to 0 dB, dB2 corresponds to 2 dB and so on.
preambleInitialReceivedTargetPower Initial preamble power in TS 36.321 [6]. Value in dBm. Value dBm-120 corresponds to -120 dBm, dBm-118 corresponds to -118 dBm and so on.

Fig. 47

Source: https://www.etsi.org/deliver/etsi_ts/136300_136399/136331/15.03.00_60/ts_136331v150300p.pdf, Page 498, Last Accessed April 01, 2021, Exhibit H

18Pre. The apparatus according to claim 15: **18a.** wherein the processor is configured to determine that the access re-attempt from the second preamble was unsuccessful, and responsive to such determining to cause the transmitter to again re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the	The accused product comprises a processor which is configured to determine that the access re-attempt from the second preamble was unsuccessful, and responsive to such determining to cause the transmitter to again re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power. *Refer to supporting evidence of claim element 14[a].*

third transmit power is greater than the first transmit power and greater than the second transmit power;	
18b. and wherein the signature sequence of the third preamble is the selected signature sequence of the first preamble retrieved from the memory.	The accused product comprises a processor wherein the signature sequence of the third preamble is the selected signature sequence of the first preamble retrieved from the memory. *Refer to supporting evidence of claim element 14[b].*
1Pre. A method comprising: **1a.** attempting access to a wireless network by sending from a transmitter on a random access channel at a first transmit power a first	The accused product practices a method comprising attempting access to a wireless network by sending from a transmitter on a random-access channel at a first transmit power a first preamble comprising a signature sequence randomly selected from a set of signature sequences. *Refer to supporting evidence of claim element 10[a].*

preamble comprising a signature sequence randomly selected from a set of signature sequences;	
1b. responsive to determining that the access attempt from sending the first preamble was unsuccessful, re-attempting access to the wireless network by sending from the transmitter on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second	The accused product practices a method comprising responsive to determining that the access attempt from sending the first preamble was unsuccessful, re-attempting access to the wireless network by sending from the transmitter on the random-access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power. *Refer to supporting evidence of claim element 10[b].*

transmit power is no greater than the first transmit power.	
2Pre. The method of claim 1, wherein: **2a**. the signature sequence of the first preamble and the signature sequence of the second preamble are each randomly selected from the set of signature sequences separately;	The accused product practices a method wherein the signature sequence of the first preamble and the signature sequence of the second preamble are each randomly selected from the set of signature sequences separately. *Refer to supporting evidence of claim element 11[Pre].*
2b. and wherein determining that the access attempt from sending the first preamble was unsuccessful comprises	The accused product practices a method wherein determining that the access attempt from sending the first preamble was unsuccessful comprises monitoring an acquisition channel of the wireless network and failing to find an acquisition indicator on the acquisition channel that corresponds to the sent first preamble. *Refer to supporting evidence of claim element 11[a].*

monitoring an acquisition channel of the wireless network and failing to find an acquisition indicator on the acquisition channel that corresponds to the sent first preamble.	
3. The method according to claim 2, further comprising determining an initial transmit power from an indication obtained from higher layers, and wherein the first transmit power is equal to the second transmit power which is the determined initial power.	The accused product practices a method comprising determining an initial transmit power from an indication obtained from higher layers, and wherein the first transmit power is equal to the second transmit power which is the determined initial power. *Refer to supporting evidence of claim element 12[c].*

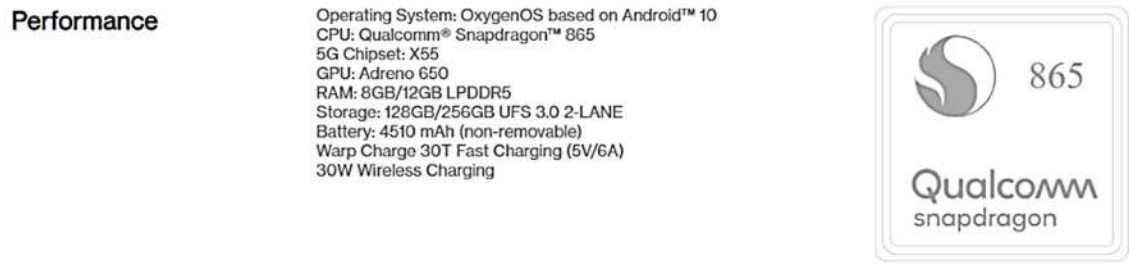
5Pre. The method according to claim 2, further comprising: **5a.** responsive to determining that the access re-attempt from sending the second preamble was unsuccessful, again re-attempting access to the wireless network by sending from the transmitter on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first	The accused product practices a method comprising responsive to determining that the access re-attempt from sending the second preamble was unsuccessful, again re-attempting access to the wireless network by sending from the transmitter on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power, and in which the signature sequences for the first, second and third preambles are each randomly selected from the set of signature sequences separately. *Refer to supporting evidence of claim element 14[a] and 14[b].*

transmit power and greater than the second transmit power, and in which the signature sequences for the first, second and third preambles are each randomly selected from the set of signature sequences separately.	
6Pre. The method of claim 1, wherein: **6a.** the signature sequence of the first preamble is randomly selected from the set of signature sequences and the signature sequence of the second preamble is the same as the	The accused product practices a method wherein the signature sequence of the first preamble is randomly selected from the set of signature sequences and the signature sequence of the second preamble is the same as the signature sequence of the first preamble. *Refer to supporting evidence of claim element 15[a] and 15[b].*

signature sequence of the first preamble;	
6b. and wherein determining that the access attempt from sending the first preamble was unsuccessful comprises monitoring an acquisition channel of the wireless network and failing to find an acquisition indicator on the acquisition channel that corresponds to the sent first preamble.	The accused product practices a method wherein determining that the access attempt from sending the first preamble was unsuccessful comprises monitoring an acquisition channel of the wireless network and failing to find an acquisition indicator on the acquisition channel that corresponds to the sent first preamble. *Refer to supporting evidence of claim element 15[c].*
7. The method according to claim 6, further comprising determining an initial transmit power from an	The accused product practices a method comprising determining an initial transmit power from an indication received from higher layers, and wherein the first transmit power is equal to the second transmit power which is the determined initial power. *Refer to supporting evidence of claim element 16[a] and 16[c].*

indication received from higher layers, and wherein the first transmit power is equal to the second transmit power which is the determined initial power.	
9Pre. The method according to claim 6, further comprising: **9a.** responsive to determining that the access re-attempt from sending the second transmit preamble was unsuccessful, again re-attempting access to the wireless network by sending from the	The accused product practices a method comprising responsive to determining that the access re-attempt from sending the second transmit preamble was unsuccessful, again re-attempting access to the wireless network by sending from the transmitter on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power, and in which the signature sequence of the third preamble is the same as the signature sequence of the first preamble and of the second preamble. *Refer to supporting evidence of claim element 18[a] and 18[b].*

transmitter on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power, and in which the signature sequence of the third preamble is the same as the signature sequence of the first preamble and of the second preamble.	
19Pre. A non transitory computer readable memory storing a	The accused product contains a non-transitory computer readable memory storing a program of instructions that when executed by a processor result in actions.

program of instructions that when executed by a processor result in actions comprising:	OnePlus is a smartphone manufacturer that releases many phones such as OnePlus 8, 8 Pro, Nord, 9, 9 Pro, etc. By way of an example, OnePlus 8 Pro comprises of 4G and 5G supported Qualcomm Snapdragon 865 processor along with 8GB/16GB RAM and 128GB/256GB ROM. See Fig. 48 and Fig. 49. **Citation 48: OnePlus 8 Pro Specifications**  Fig. 48 Source: https://www.oneplus.in/8-pro/specs?from=8pro, Page 2&3, Last Accessed April 01, 2021, Exhibit A

Citation 49: OnePlus 8 Pro Processor

Fig. 49

Source: https://www.oneplus.com/8-pro, Page 6, Last Accessed April 01, 2021, Exhibit B

By way of an example, OnePlus 8 Pro (i.e., the accused product) supports various automatic features like autofocus, AI Scene Detection, etc. Moreover, OnePlus 8 Pro has over 280 software optimizations for smooth and effortless swiping and scrolling. See Fig. 50 and Fig. 51.

Based on information and belief, OnePlus 8 Pro (i.e., the accused product) contains computer-readable memory storing a program of instructions that can be executed by a processor for performing all such functionalities.

Citation 50: OnePlus 8 Pro Features

Zoom

3× hybrid zoom

Autofocus

Multi Autofocus (All pixel omni-directional PDAF+LAF+CAF)

Video

4K video at 30/60 fps
1080P video at 30/60 fps
Super Slow Motion: 720p video at 480 fps, 1080p video at 240fps
Time-Lapse: 1080P 30fps, 4k 30fps
Video Editor

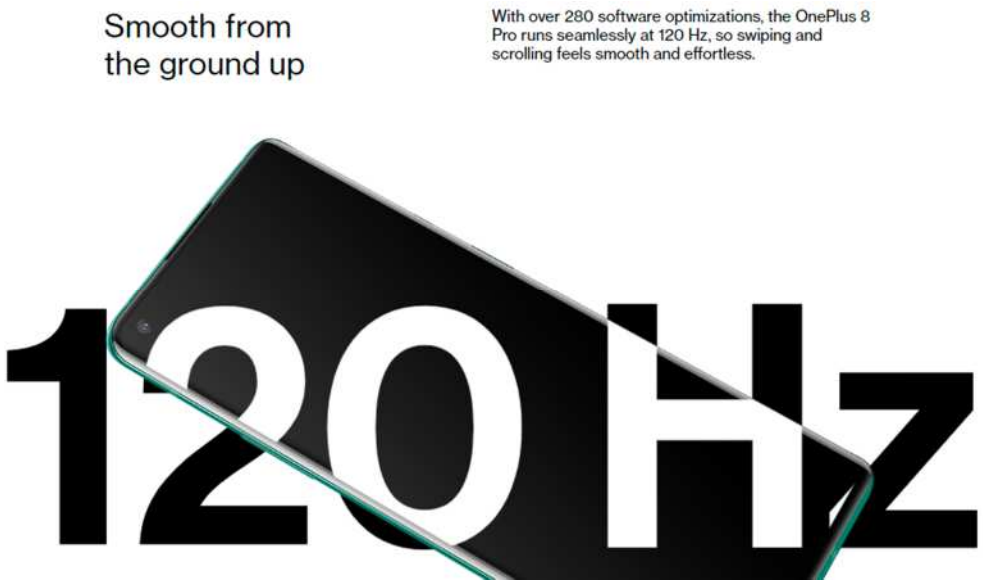
Features

CINE aspect ratio video recording, Video HDR, Cat&Dog face detect & focus, UltraShot HDR, Nightscape, Super Micro, Portrait, Pro Mode, Panorama, AI Scene Detection, RAW Image, Audio Zoom, Audio 3D

Front Camera

Sensor: Sony IMX471
Megapixels: 16
Pixel Size: 1.0 µm
EIS: Yes
Autofocus: Fixed Focus
Aperture: f/2.45

Fig. 50

	Source: https://www.oneplus.in/8-pro/specs?from=8pro, Page 2, Last Accessed April 01, 2021, Exhibit A **Citation 51: Software Optimization in OnePlus 8 Pro**  Fig. 51 Source: https://www.oneplus.com/8-pro, Page 3, Last Accessed April 01, 2021, Exhibit B
19a. attempting access to a wireless network by sending on a random access channel at a first	The accused product contains a non-transitory computer readable memory comprising attempting access to a wireless network by sending on a random-access channel at a first transmit power a first preamble comprising a signature sequence randomly selected from a set of signature sequences.

transmit power a first preamble comprising a signature sequence randomly selected from a set of signature sequences;	*Refer to supporting evidence of claim element 10[a].*
19b. responsive to determining that the access attempt from sending the first preamble was unsuccessful, re-attempting access to the wireless network by sending on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power	The accused product contains a non-transitory computer readable memory comprising responsive to determining that the access attempt from sending the first preamble was unsuccessful, re-attempting access to the wireless network by sending on the random-access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power. *Refer to supporting evidence of claim element 10[b].*

is no greater than the first transmit power.	
20Pre. A non transitory computer readable memory of claim 19, wherein: **20a.** the signature sequence of the first preamble is randomly selected from the set of signature sequences and the signature sequence of the second preamble is the same as the signature sequence of the first preamble, retrieved from a memory.	The accused product comprises a non transitory computer readable memory wherein the signature sequence of the first preamble is randomly selected from the set of signature sequences and the signature sequence of the second preamble is the same as the signature sequence of the first preamble, retrieved from a memory. *Refer to supporting evidence of claim element 6[a].*